from the ependyma, the cells preserve their cylindrical form, whereas in tumors growing from the choroid plexus the cells are more cuboidal.

Dr. Donaldson said he thought the general opinion was that secreting cells are only those which cover the choroid proper. Dr. Donaldson said that the gentlemen had spoken of the work as his, but he wished to emphasize the fact, that it is the work of Dr. Meek, done under Dr. Hatai in Dr. Donaldson's laboratory.

DEVELOPMENT OF THE CORPUS CALLOSUM.

By Dr. G. L. Streeter.

A description of five models reconstructed from human embryos 80, 95 and 150 mm. long, showing the morphology of the corpus callosum, fornix, and anterior callosum. In the youngest stage the corpus callosum and commissure of the fornix form together a round bundle of fibers crossing in the lamina terminalis, dorsal to the fibers of the anterior commissure, as a result of the caudal migration of the fornix commissure, the corpus callosum becomes gradually separated from it and maintains its position so that its center remains dorsal to the anterior commissure. The two originally are nearly equal in bulk, but the fornix commissure early comes to a standstill in growth, while the corpus callosum continues to increase in number of fibers until it reaches the proportion formed in the adult. This transportation occurs in what may be considered as modified lamina terminalis and the so-called fifth ventricle develops as a cavity of the lamina terminalis.

PHILADELPHIA NEUROLOGICAL SOCIETY.

April 23, 1907.

The President, Dr. Alfred Gordon, in the Chair.

A CASE OF STAB WOUND OF THE NECK.

By Drs. John Mulrenan and Cyrus Fridy.

The patient, J. D. L., a boy of 17, was admitted to the Howard Hospital, in the service of Dr. John H. W. Rhein, on December 2, 1906. He came with a history that he had just been stabbed with a stiletto on the left side of his neck. He had been drinking, but was not intoxicated.

Examination revealed the presence of a small stab-wound on the left side of the neck, just above the clavicle, at about the junction of the outer and middle thirds. Shortly after his admission he was seized with a convulsion, which was limited to the left side. The eyes twitched during the entire convulsion, and there was an internal squint of the left eye. The head was drawn to the left. He remained partially unconscious after the convulsion, until the following day when he could be partially aroused.

Upon examination there seemed to be some weakness of the left arm at this time. He moved both legs freely. The tongue was protruded in a straight line. There was no asymmetry of the face, and the muscles of both sides of the face were moved equally well. He made no effort to grasp the hand of the examiner with his left hand, and did so feebly with the right hand. He was hyperesthetic on the right side of his chest and right arm, but completely analgesic in the left arm. His respirations were 32 to the minute.

On December 5th, 4 days after his admission, the mental condition had improved very much, and he was quite rational. Efforts to raise the left arm were entirely unsuccessful, but the grasp of the left hand was fairly good. There seemed to be no diminution in the power of either leg. There was marked weakness of the pectoral and biceps muscles. There seemed to be an anesthesia of the conjunctiva of the left eye. There was some disturbance of sensation in the left arm as well, but this could not be positively determined on account of the mental condition of the patient.

The eyelids were kept closed, and when forcibly opened by the examiner the eyeballs were found to be turned to the left. The left pupil was slightly larger than the right, and did not respond to light.

The right knee jerk was present, and about normal; the left knee jerk was very slight. The plantar reflexes were active. Babinski's sign was not developed.

During this examination there was a repetition of the convulsive seizures, of which he had had several since his admission. There was an irregular clonic spasm of the muscles of the left arm and leg and of the face. The eyelids were firmly closed and there was a tendency to opisthotonos. He was apparently unconscious during the convulsion. Some of these convulsive seizures, observed later, began with spasmodic twitchings of the left side of the face, and of the muscles of the shoulder girdle on the left side, becoming general. After several of the convulsions the twitchings of the left side of the face and the left shoulder-girdle muscles, persisted off and on for some hours.

On December 15th, 12 days after his admission, he had a general marked convulsion, after the introduction of the catheter, lasting for an hour and three-quarters. This began on the left side of the face, and spread rapidly, becoming general, and was tonic and clonic alternately.

On December 17th, 15 days after his admission, his grasp was equal and good on each side. He extended his left arm with almost as much power as the right. The power in the biceps muscle, however, was feeble, and he had scarcely any power in the left deltoid.

Pronation and supination of the forearm were weak, and there was hypalgesia of the left arm and of the conjunctiva of the left eye. The deltoid, the biceps, the supra and infra-spinati muscles, the pectoral group, and the latissimus dorsi, appeared weaker on the left side than on the right.

Examination of the color fields, form fields, and optic nerves was normal. The ocular movements were normal (Dr. W. C. Posey).

An irregular fever was present for the first 9 days of his sojourn in the hospital.

Lumbar puncture was made on the fourth day, with negative results.

The patient left the hospital in a few days, his condition remaining unchanged.

He was again examined on April 23, 1907, in the Out-Clinic, when he stated that there had been no recurrence of the convulsive seizures, and that he had returned to work some weeks back. On this date it was found that the left biceps muscle was markedly wasted and weak. The deltoid was also weak, but did not show much, if any, wasting. There was distinct wasting of the supra and infra-spinati muscles of the left side. In other respects the muscles of the shoulder-girdle and arm appeared to be normal.

There was a slight hypalgesia over the left deltoid.

The scar was situated just above the clavicle, and four and a quarter inches behind the sternoclavicular articulation, and measured about 13-16 of an inch in length.

An electrical examination at this time showed the presence of reactions of degeneration in the left biceps muscle, and in the infraspinatus muscle. The muscles of the remainder of the arm, shoulder, and chest responded normally.

At first the stuporous state, convulsive seizures, the rise of temperature, and paralysis of the left arm led to the suspicion that the stiletto had entered the vertebral canal, injuring the meninges and possibly the cord. The disappearance of the convulsions, and rapid clearing up of the mental condition, with the paralysis limited to the biceps, deltoid, supra and infraspinati, pectoral and latissimus dorsi muscles on the left side, were all sufficient to change the diagnosis in a few days.

The convulsions were believed to be hysterical in origin, and the cause of the paralysis, an injury to the brachial plexus.

A study of the brachial plexus shows that a single lesion, to produce paralysis of the muscles described in this case, must be at the portion of the fifth cervical nerve just before it joins the brachial plexus.

Paralysis of the upper roots of the brachial plexus arises chiefly from fracture of the clavicle, difficulties at birth, injuries about the shoulder, infantile paralyses, and wounds of the neck and shoulder.

The muscles affected in injuries of the upper roots of the brachial plexus are the deltoid, supra and infraspinatus, biceps, pectoral muscles, brachialis anticus, and the supinator longus, with wasting of the muscles, and reactions of degeneration. There is loss of power at the main joints, with inability to abduct the shoulder, and to flex the forearms. There is likewise a loss of cutaneous sensation in the areas supplied by the circumflex and certain branches of the musculo-spiral nerve.

Penetrating wounds in this region, with injury to the nerve roots forming the brachial plexus, are comparatively rare. One other case, reported by Harris of England, was that of a young girl stabbed in the neck, the blade entering at the fourth cervical spine and taking a course to the posterior border of the sternocleidomastoid muscle. Subsequently, at operation, the root of the fifth cervical nerve was found to be completely severed. There was, in this case, complete paralysis of the muscles abducting the shoulder, and inability to flex the forearm, with wasting of the muscles, and complete reactions of degeneration.

In this connection it is interesting to read the statistics of Strauch (*Wein. med. Woch.*, Nov. 7, 1903, p. 2131) who classified stab-wounds in the spinal region as follows:

"Those from before backward, in which the weapon may go through —(1) the intervertebral disks; (2) through the body of the vertebræ, destroying them; (3) through the intervertebral foramens; (4) through the transverse foramen of one spine into the intervertebral foramen between this and that of the one below, and finally, into the spinal canal. Stab-wounds from below upward, in which the weapon may pass—(1) through the intercrural spaces; (2) between the spinous processes; (3) through the trigonum arteriæ vertebralis. The size of the wound depends upon the sex, age, and bony structure. The size of the wound between the vertebræ differs in different individuals of the same age, and on the right and left sides of the same individual. It is rare that stab-wounds of the anterior cervical region into the spinal canal are associated with injury to the large vessels of the neck. In these last injuries it is possible—(1) not to injure the membranes of the cord; (2) to involve the membranes; (3) to penetrate the membranes and injure the cord; (4) to injure the membranes, the roots, or root-fibers of the same side, but not to affect the spinal cord; (5) to injure the membranes and the roots of the other side, but not to involve the spinal cord. In neck wounds from before, in the direction of the spinal canal, it is possible for the weapon to glide along the anterior side of the spinal column on the prevertebral fascia, and to injure a nerve on the opposite side. The spinal cord becomes frequently injured in stab-wounds of the back in the thoracic region, in such a way that the external wound, and the spinal cord lesion are on opposite sides. It is possible to demonstrate the direction taken by the weapon from the appearance of the external wound."

Dr. Rhein said that this case had been admitted into the wards of the Howard Hospital in his service, and presented at first some very confusing symptoms. The patient was at first in a semi-conscious condition, and while being examined he developed a convulsion which began with twitching of the left side of the face, extending to the left shoulder muscles, and finally becoming general. During the few days after his admission he had several convulsions of this sort, and also some attacks in which only the left side of the face and the muscles of the left shoulder were involved. He was also anesthetic in the left conjunctiva, in the cervical region, and in the left arm. There was rise of temperature extending over a few days.

At first it occurred to Dr. Rhein that the knife had entered the spinal canal and injured the meninges, and possibly the spinal cord, and that the convulsive seizures were due to irritation of the meninges or cord, but the rapid return to a normal mental state, associated with anesthesia of the conjunctiva of the left eye, of the left arm and shoulder, not limited to any particular nerve distribution, and the irregularity of the convulsive seizures, justified him in the diagnosis of hysteria, added to an injury of the brachial plexus. Dr. Rhein thought that the diagnosis presented by Drs. Mulrenan and Fridy—namely, that the fifth cervical nerve was injured,—was the probable explanation of the symptoms presented by this patient.